

To : NIEMS PSG  
From : S9(2)(a) [REDACTED]  
Date : 26 June 2018  
Subject: NIEMS Production Deployment

## Purpose

This paper documents the production deployment for NIEMS on Friday 8 June 2018 and its subsequent roll back. It summarises the actions that were completed and identifies lessons learned.

## Background

It is a 17/18 SPE milestone to launch the National Incident and Event Management System in Wellington and Christchurch.

### Project Progress 17/18

Following a project reset, a high level roadmap out to 30 June 2018 was developed with the TOCs and agreed by the NIEMS PSG in Nov 2017 then endorsed by the TGG in Dec 2017. See Appendix 1. This roadmap was designed to deliver a first iteration towards the provision of consistent processes, capability and tools to manage incidents and planned events nationally and is considered the first feature set to be delivered under the transport Operating System.

A more detailed roadmap was refined early April 2018 in conjunction with the TOCs and shared with the NIEMS PSG. This was further refined in May 2018. See Appendix 2 and 3.

Progress against the roadmap was reported on through the monthly Status Report to the NIEMS PSG and the CJS portfolio report to TGG as well as in quarterly SLT reporting.

The project has been tracking to deliver against the 17/18 SPE milestone up until May 2018 where recurring delays through the change process increased the risk of delivery timelines being impacted.

### Production Deployment Planning

As part of preparing to move ILS production to the cloud, a security assurance report on the Google cloud platform was completed and reviewed by the NIEMS PSG in Feb 2018.

Go live dates were discussed and agreed with WTOC Manager. This date was delayed several times due to a combination of Fujitsu readiness for servers and extreme weather. The programme was initially targeting a go live date of 10 May 2018 and finally firmed up as 8 June 2018 for deployment.

The TOC Operational Checklist Acceptance Criteria template was completed to prepare for deployment of production into the cloud. This includes sign off for relevant functions as follows:

- Design

- Security
- Privacy
- Test Planning and Reporting
- Early Life Support
- Support Operate Phase
- Release Notes
- Disaster Recovery
- Business Sign Off
- Project Management

Training was not required as this release did not change the operator functionality. It was agreed for the Government Chief Digital Office (GCDO) cloud assessment process for the Google Cloud Platform to be progressed in parallel to this process.

The NZTA Fujitsu Change Management Request for Change Form was submitted to Fujitsu from which a Fujitsu work request was generated and included in their weekly change plan.

The approval to migrate the ILS database and enable ILS production to be deployed in the cloud was given as an exception to the historical change process but supported by the completion of these standard change forms.

## Deployment

Friday 8 June 1-5 AM

The Project Manager, 2 Developers and the shift Team Leader completed the change in conjunction with the Fujitsu DBA on shift.

An implementation test exit report was completed documenting the process. See Appendix 4.

The process was completed at 4:30 AM and email notification advising the business of the successful data migration was sent at 4.42 AM

## Post Deployment

Four service desk requests were logged mid-late afternoon on 8 June after the deployment. These related to user login issues and duplicate or triplicate log entries.

The user login issues related to the ITS active directory and were all resolved by 4:30 PM 8 June. Duplicate or triplicate log entries were occurring intermittently when populated from TRIES into NIEMS. The duplication issue was confirmed resolved by 7:00 PM 8 June.

Further intermittent problems presented as saving issues over the course of the weekend and a new support ticket was raised Sunday 19:30 PM 10 June. The ticket was mis-categorised by Fujitsu as a P3, i.e. fix in business hours. This was not escalated to a P2 until Monday at 8:00 AM 11 June after a discussion with Fujitsu.

Five more issues were raised on 11 June for problems presenting as:

- Details not saving or saving in the wrong event
- Event initiator unable to reopen event in TREIS
- Overall system slowness



These have been categorised as symptoms of the same underlying problem.

Early analysis suggested that the problems may have been due to a database configuration setting. As these are adjustable, some changes were made to try to resolve the issue. The problems were intermittent in their nature and configuration changes did not resolve the underlying problem.

As part of the problem investigation the developer tried reducing the number of servers but this caused the SCATS team to lose access to ILS for a time. With a severe weather warning in place for the next 24 hours, alternative options were considered to resolve the issues.

The decision was taken at 3:00 PM, in conjunction with WTOC to implement a temporary roll back and allow time to find a solution to the problem, whilst providing a stable solution for the operators. Open tickets were manually re-entered back into the old ILS.

## Problem Resolution

The team completed an investigation into the user problems to identify and resolve the underlying cause of poor response times, page submit errors and system performance.

The cause was determined to be from the original ILS code using a database access library (Hibernate) at one version and the newer NIEMS release using a later version of the library which had some subtle changes in the management of connections to the database. As a result when usage reached a certain volume level connections would start to become unavailable leading to the intermittent faults.

On Monday 11 June, the team were able to reproduce the errors, first on the staging server and later on local development systems. Code changes were made to resolve the problem. Performance load and stress tests were run and passed. Performance tests for the cloud deployment were also reproduced locally at WTOC and passed.

The following changes have been made to NIEMS:

Change	Impact
Update the ILS code to correctly use the database library	Resolve the issue of database connection pools being exhausted quickly
Improve the efficiency of the old ILS code by optimising access to the database to reduce the number of redundant calls in normal usage	Reduces overall stress on the system and will improve overall response times and server load
Optimise some of the new NIEMS code	Reduce query times
Increase database instance size	Increase the maximum number of connections to database
Improve ILS notification mechanism so that they are regional based	Events updated in Auckland do not impact on the server for Wellington users
Create JMeter performance test	Stress test so that we know what the upper limit of the system's performance is

## Retrospective

A lessons learned meeting was undertaken with the NIEMS project team on Tuesday 12 June 2018 to understand what happened, why and identify opportunities to improve. The following observations and recommendations were documented:

Observation	Recommendation
Application was tested manually by users at the time of release and through automated testing but did not undergo sufficient load testing with multiple users	Automated parallel and high volume load testing with prior quality test coverage is implemented and added to the Definition of Done
A detailed Implementation Plan was done several weeks in advance but the Fujitsu staff implementing the plan were unfamiliar with it at the time of executing the plan	"Full Dress Rehearsal" with all parties involved prior to D-Day
Multiple cross communication due to key staff away sick	Recommend clear lines of communication, escalation and accountability be published
Interruptions to staff working on incident response	Dedicated staff working on the problem should not be interrupted to give regular updates. Setup an incident management group chat to manage communications within the team and nominate a spokesperson to interact with other stakeholders
Changes directly in production affected live users	No changes be done in Production without going through stage testing
The Fujitsu support desk was unclear on the escalation rules and sign offs for the process were unclear	Clear support process be published and signed off by all parties prior to D-Day
A new release of software with fundamental changes to underlying components was not bedded down with users for a long enough period	Designated staff be on hand with the customers for the initial few days - especially if this is over a weekend.

## Issue Resolution and Performance Testing

The underlying problem that manifested as poor response times, page submit errors and other problems was investigated, identified and corrected.

The problem was caused by the original ILS code using a database access library (Hibernate) at one version and the newer NIEMS release using a later version of the library which had some subtle changes in the management of connections to the database. As a result when usage reached a certain volume level connections would start to become unavailable leading to the intermittent faults.

The errors were reproduced, first on the staging server and later on local development systems first through manual load test and later through an automated test.

A JMeter performance test was created in order to stress test the system. This test emulates a number of users constantly using the NIEMS UI and creating incidents. The numbers are increased until the system starts to show an error or increasing response times.

The test methodology and results have been published on the CIS Wiki accessible from here:

Link to internal NZTA folder

## Redeployment

### Detailed Planning Update

A detailed plan to redeploy ILS to the cloud was revised and agreed with the business on Thursday 21 June 2018 with a new target date of Saturday 23rd June 2018 subject to weather, road works and no major incidents. See 0618.3.0 NIEMS Releases Detailed Plan.

The plan included a higher level of on-site support for the first days following the release.

Actions against the revised detailed plan were completed on Friday 22 June, all tickets were signed off and a final go-live was agreed to at 6pm 22nd.

### Redeployment

Saturday 23 June 7-11 PM

The Manager Transport Operating System and Business Analyst were on site in Wellington for the deployment. Along with the Project Manager, 2 Developers and the shift Team Leader they completed the change in conjunction with the Fujitsu DBA on shift.

An implementation test exit report was completed documenting the process. See Appendix 5. The process was completed at 11 PM and email notification advising of the successful data migration was sent.

On-site support from the project team was maintained for 48 hours as per the rotating schedule and observations documented in the Post Release After Care Notes.

No new problems were identified and operator's feedback was that they experienced increased performance from the new system.

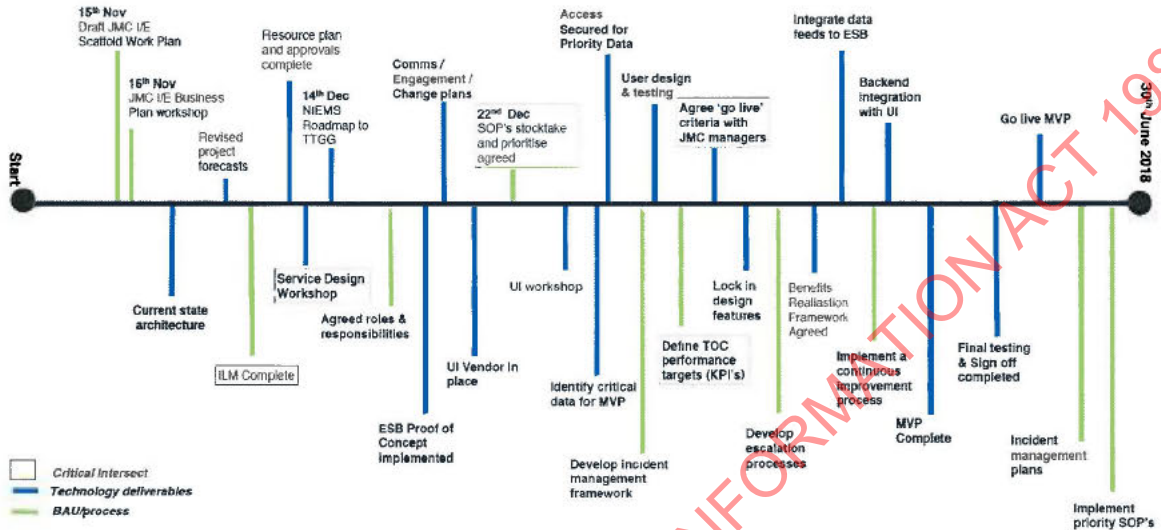


## Appendix 1

### Approved High Level NIEMS Roadmap – November 2018

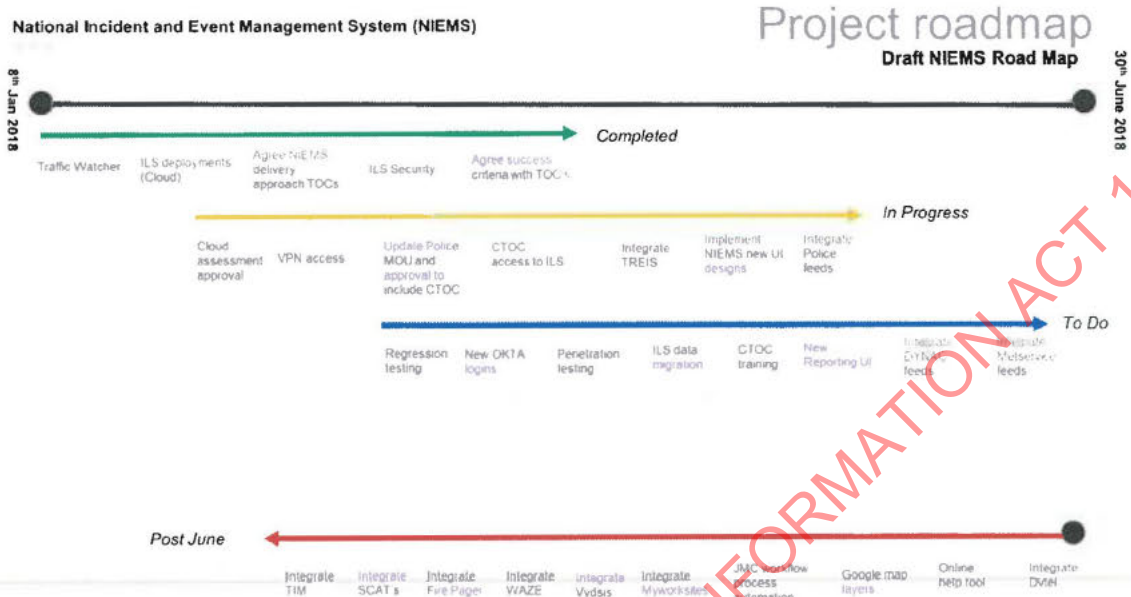
National Incident and Event Management System (NIEMS)

Project roadmap  
Draft NIEMS Road Map



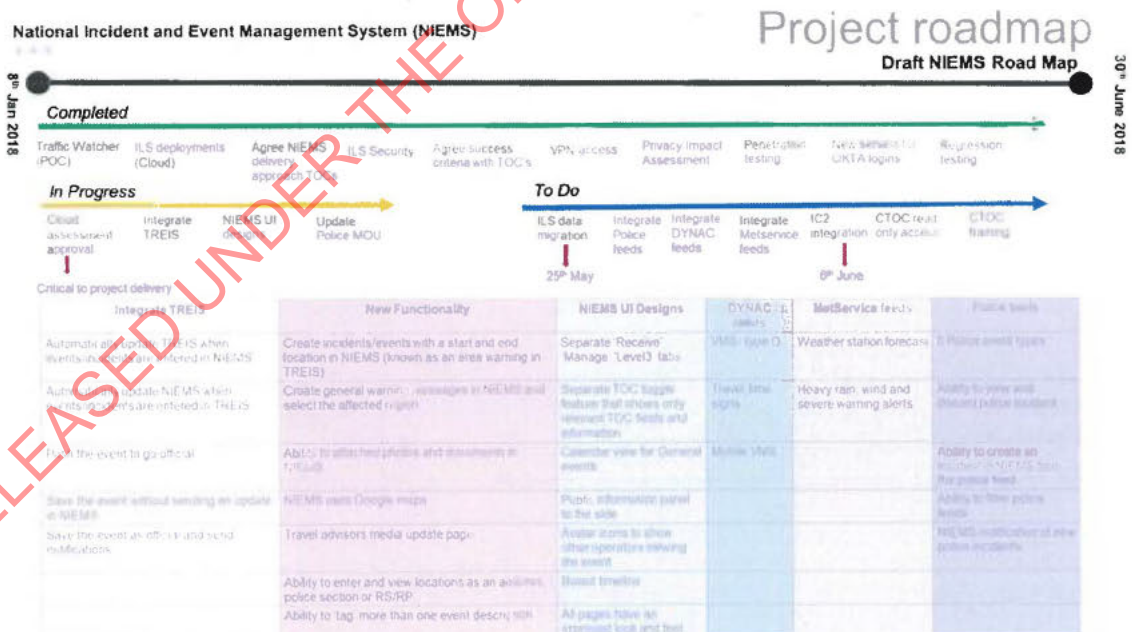
## Appendix 2

### Updated NIEMS Roadmap – 6 April 2018



## Appendix 3

### Updated NIEMS Roadmap – April 2018



## Appendix 4

### Implementation Test Exit Report – 8 June 2018

Implementation Steps:	Task #	Details	Implementer(s)	Date/Time
	1	Create full database backup from ILS SQL Server Database PROD	Fujitsu DBA	08/06/2018 01:01
	2	Zip the backup and encrypted with a password. The password must be at least 10 characters long and should contain symbols and alphanumeric.	Fujitsu DBA	08/06/2018 01:15
	3	Link to internal NZTA folder	Fujitsu DBA	08/06/2018 02:10
	4	S9(2)(a)	Fujitsu DBA	08/06/2018 02:15
	5	Convert SQL Server dump to Postgres SQL dump	S9(2)(a) (NZTA)	08/06/2018 02:40
	6	Make Postgres SQL dump to be compatible with GCP Postgres	S9(2)(a) (NZTA)	08/06/2018 02:50
	7	Upload Postgres dump to GCP	S9(2)(a) (NZTA)	08/06/2018 02:55
	8	Apply Postgres dump to NIEMS production database	S9(2)(a) (NZTA)	08/06/2018 03:00
	9	Release/Start NIEMS application prod	S9(2)(a) (NZTA)	08/06/2018 03:05

Post Test / Verification Plan:	Task #	Details	Implementer(s)	Date/Time
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(High level test steps to qualify the change outcome with supporting doc emailed to Change team if required; Include Technical and User Testing.	1	<p>Application Checks:</p> <ul style="list-style-type: none"> <li>a) Check application is up and running</li> <li>b) Check all pages load successfully</li> <li>c) Compare what shown on the page to what's in the database</li> <li>d) Create a test event/incident to ensure it works.</li> <li>e) Run reports</li> <li>f) Check Travel Times (to ensure connectivity to TIM)</li> <li>g) Login to Corporate Service workstation</li> </ul> <p>Link to internal NZTA folder</p> <p>Check maps are loaded correctly.</p>	<p>S9(2)(a)</p> <p>(NZTA)</p>	08/06/2018 03:05
	2	<p>Database checks:</p> <ul style="list-style-type: none"> <li>a) Check NIEMS Postgres DB table have exactly same number of rows as ILS SQL Server</li> <li>b) Check sequences are correctly set</li> <li>c) Check 'TEXT' datatype columns are correctly populated</li> <li>d) Check Geometry datatype columns are correctly populated</li> </ul>	<p>S9(2)(a)</p> <p>(NZTA)</p>	08/06/2018 03:10
	3	<p>Business Test:</p> <p>WTOC to test NIEMS application as per the embedded test plan.</p>	WTOC (NZTA)	08/06/2018 03:10
	4	Go/No-Go decision	<p>S9(2)(a)</p> <p>(NZTA)</p>	08/06/2018 04:25
	5	If GO, notifies WTOC to use NIEMS application	<p>S9(2)(a)</p> <p>(NZTA)</p>	08/06/2018 04:30

## Appendix 5

### Implementation Test Exit Report – 23 June 2018

	Test	Pass	Fail	Comments
1	Log in - Chrome, time taken to load, same or better as current ILS	x		Same timing
2	Log in - Firefox, time taken to load, same or better as current ILS	x		Same timing
3	Log in - IE, time taken to load, same or better as current ILS	x		Now works in IE
4	Historical data available from February 2018 in all tabs and able to search in current, recent and history	x		108 extra events in the system from previous rollout
5	Historical data available from July 2017 in all tabs and able to search in current, recent and history	x		
6	TREIS roadworks displayed	x		
7	TREIS roadworks data - description, comment details, location, TREIS ref # displayed	x		Checked 5 events, all showing correct information
8	TREIS incidents displayed	x		Checked 5 events, all showing correct information
9	TREIS incidents data - description, location, source, start time, notification time, incident level, TREIS ref # displayed	x		
10	Open current fault from the fault tab, search current fault in this tab	x		
11	Open recent fault from the fault tab, search recent fault in this tab	x		
12	Open fault history from the fault tab, search within fault history	x		3 extra events in the previous system from previous rollout

13	Pop up menu works in Fault tab	x		
14	Faults: Dropdown fields are populated and work, able to select all options, able to change/clear selection	x		
15	Open current SCATS from the SCATS tab, and search for current SCATS event	x		
16	Open recent SCATS from the SCATS tab, and search for recent SCATS event	x		
17	Open SCATS history from the SCATS tab,, and search for SCATS event from history	x		33 extra events in the previous system from previous rollout
18	Open travel times tab and display information	x		Journey times not displaying but the signs are off
19	Overall speed (faster than current ILS), able to move between tabs and events with ease (no delay)	x		
20	Create new <b>closure</b> , able to complete all fields	x		Slight delay in creating, less than 5 seconds
21	Progress Closure with "Sign Out" button	x		
22	"Sign out" added to timeline timestamp accurate, timestamp edited	x		
23	"Sign out" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
24	Progress Closure with "Closure In" button	x		
25	"Closure In" added to timeline timestamp accurate	x		
26	Closure timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
27	Progress Closure with "Police Advised" button	x		



28	"Police Advised" added to timeline timestamp accurate	x		
29	"Police Advised" timeline timestamp edited	x		Changes to times not captured in timeline - same as ILS testing
30	Progress Closure with "Reopened" button	x		
31	"Reopened" added to timeline timestamp accurate	x		
32	"Reopened" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
33	Progress Closure with "Off Network" button	x		
34	"Off Network" added to timeline timestamp accurate	x		
35	"Off Network" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
36	Create a new incident, able to complete all fields	x		All sections tested, map tested, timeline checked, all buttons checked all ok - Only once did the field self-clear
37	Progress incident using "All Lanes Open" button	x		
38	"All lanes open" added to timeline timestamp accurate	x		
39	"All lanes open" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
40	Progress incident using "Traffic Normal" button	x		Timings much better than previous version, picked up in 3 seconds

41	"Traffic Normal" added to timeline, timestamp accurate	x		
42	"Traffic Normal" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
43	Progress incident using "Close" button	x		
44	"Close" added to timeline, timestamp accurate	x		
45	"Close" timeline timestamp editable	x		
46	Create new <b>roadwork</b> , able to complete all fields	x		STMS will not populate but this section not used by Wellington. ATOC has a list that populates for them in this
47	Progress roadwork using "Roadworks in" button	x		
48	"Roadworks in" added to timeline, timestamp accurate	x		
49	"Roadworks in" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
50	Progress incident using "Off network" button	x		
51	"Off network" added to timeline, timestamp accurate	x		
52	"Off network" timeline timestamp editable	x		Changes to times not captured in timeline - same as ILS testing
53	Open Detail Report (All Incidents) from the reports tab	x		Timeline showing out of sequence
54	Open Detail Report (Level 3 and Above) from the reports tab	x		Time captures are showing the time down to the millisecond

55	Open Summary Report (All Incidents) from the reports tab	x		
56	Open Monthly Summary Report (Events) from the reports tab	x		
57	Open Duration Report (Incidents) from the reports tab	x		
58	Open Roadworks Summary from the reports tab	x		
59	Open Closure Summary from the reports tab	x		
60	Open Timings Report (Incidents) from the reports tab	x		
61	Open Incident Duration Report Enhanced from the reports tab	x		
62	Open Summary Report (Level 3 and above) from the reports tab	x		
63	Open Summary Report (Level 2 and above) from the reports tab	x		
64	Open Incident Report (SCATS) from the reports tab	x		
65	Open Incident Duration Report Contractor from the reports tab	x		
66	Open Incident Duration Report New from the reports tab	x		
67	Open Month Summary Report (Events) By Region from the reports tab	x		Order changed but not badly
68	Open General Summary Report from the reports tab	x		
69	Open Fault Summary Report from the reports tab	x		
70	Open Twitter Summary Report from the reports tab	x	Checked by S9(2)(a)	S9(2)(a)
71	Open TAR Summary Report from the reports tab	x	Checked by S9(2)(a)	S9(2)(a)
72	Generate a Detail Report (All Incidents) using the date range fields	x		



73	Generate a Detail Report (Level 3 and Above) using the date range fields	x		
74	Generate a Summary Report (All Incidents) using the date range fields	x		
75	Generate a Monthly Summary Report (Events) using the date range fields	x		
76	Generate a Duration Report (Incidents) using the date range fields	x		
77	Generate a Roadworks Summary using the date range fields	x		
78	Generate a Closure Summary using the date range fields	x		
79	Generate a Timings Report (Incidents) using the date range fields	x		
80	Generate a Incident Duration Report Enhanced using the date range fields	x		
81	Generate a Summary Report (Level 3 and above) using the date range fields	x		
82	Generate a Summary Report (Level 2 and above) using the date range fields	x		
83	Generate a Incident Report (SCATS) using the date range fields	x		
84	Generate a Incident Duration Report Enhanced using the date range fields	x		
85	Generate a Incident Duration Report New using the date range fields	x		
86	Generate a Month Summary Report (Events) By Region using the date range fields	x		
87	Generate a General Summary Report using the date range fields	x		
88	Generate a Fault Summary Report using the date range fields	x		
89	Generate a Twitter Summary Report using the date range fields	x		Checked by S9(2)(a)
90	Generate a TAR Summary Report using the date range fields	x		Checked by S9(2)(a)

91	Map opens when I click on map tab	x		
92	Manually plot event on map	x		
93	Search map using hot key (ALT +L) and plot on the map, able to change location by researching using ALT + L	x		Search now working in new system
94	Change locations using the search function	x		
95	Map speed	x		Minor lag, comparable to ILS
96	Speed of buttons updating fields in details	x		Much better than ILS was prior to the upgrade
97	Clicking on the header in incidents/roadworks/faults brings up the details in section down below	x		Checked multiple tabs and multiple (5+) events and all populating as it should
98	Make sure the notes when added to the event do not populate on another event	x		Added notes to three separate events - working fine
99	No duplicate TREIS events populating in ILS	x		TREIS event created at 22:57, populated in ILS at 22:59. no duplicate reported
100	Dummy event entered into TREIS and populates into ILS system	x		Same as above.

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